

Project #	Project Name	Project Track	Project Family
P14416	P3 Arborloo Concrete base Development		Energy and Sustainable Systems
Start Term	Team Guide	Project Sponsor	Doc. Revision
2131	Sarah Brownell	EPA P3 Award, Sarah Brownell, Dr. Thorn	

Project Description

Project Background:

An Arborloo is a simple and affordable technology in sanitation—a moveable slab over a shallow pit that can be relocated when the pit is full. In Haiti, where sanitation coverage has dropped from 26% in 1990 to 17% in 2010 (WHO), improving sanitation is crucial, especially as it relates to preventable illness caused by unsafe drinking water, poor hygiene, and inadequate sanitation.

Although the current Arborloo has a developed design, there are still several shortcomings. It takes two days to install, with the majority of time needed for the concrete to set. This 3'x3' rebar enforced concrete base is not easily transportable. Also, the aesthetics of the current design, with a covering made out of woven palm fronds and sleeping mats, is not appealing to the Haitian population. Generally, in Haiti, there is not a perceived need to purchase and maintain Arborloos.

Problem Statement:

The new design of the base needs to be simple to install, affordable, safe, moveable, and sturdy. It needs to be resistant to environmental damage caused by climate or pests. Overall, we want to develop a product that has an impact on improving basic sanitation access in Haiti.

Objectives:

1. Low cost (< \$50 to purchase)
2. Base design that safely covers an 18-20" diameter, 3-4 ft. deep hole
3. Easily constructed using simple hand tools
4. Modern aesthetics to encourage Haitians to invest in better sanitation
5. Portable
6. Resistance to environmental damage (pests, weather, use, etc.)
7. Has a modular design

Deliverables:

- 2 functional prototypes of the concrete base
 - o 2 molds

- Bill of Materials
- Design drawings (for bases and molds) to use for manufacturing and modifying parts
- Test plan and test results
- User manual to properly install the base

Expected Project Benefits:

- Provide an option that is ready for production and distribution to suppliers in developing countries
- Increase sanitation in Haiti using the new design
- New jobs available for the building and maintaining of the arborloo

Core Team Members:

- Victoria Snell, ISE
- Anthony Deleo, ISE
- Evan Burley, ME
- Joe Omilanowicz, ME
- Mac Keehufus, ME

Strategy and Approach

Assumptions and Constraints:

1. Difficult to assess Haitian preferences from Rochester
2. Utilizes either local materials or easily imported materials
3. Proposed budget= \$1500
4. Base must be made using cement
5. Must be able to be transported by person or donkey on winding/rocky paths for up to 8 hour long trips
6. Must be inexpensive to purchase, maintain, and repair
7. Resist environmental damage
8. Aesthetically pleasing
9. Reduces lifecycle environmental costs
10. Allows financing in parts

Issues and Risks:

- Team is unfamiliar with concrete
- Have limited budget
- Unknown requirements of testing equipment/facilities to mimic those of the Haitian environment